An Examination of the Relative Benefits & Limitations of CALL

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CALL の利点とリミテーションに関する研究

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Abstract :

As demonstrated by the global, COVID-19-induced turn to educational technologies, the role of computer-assisted language learning (CALL) is continually evolving, leading to a requirement for evaluation of the medium in terms of both historical and contemporary perspectives. Traditionally, CALL manifests per three phases of development, namely, the *structural, communicative,* and *integrative* phases. Through this paradigm shift, it is shown that contemporary CALL practices influence several pedagogical factors. For institutions, CALL offers flexibility, enhanced accessibility, and location independence, but suffers from assessment and mediational issues. The role of the practitioner is also significantly impacted, perhaps necessitating adaptational strategies and a reevaluation of teacher positionality given the reduction of in-situ presence and potential absence of technological capacity or interest. Learners were ultimately identified as the most significant consideration on the basis that digital environments foster increased personal interactions, digital literacy and, if implemented correctly, higher cognitive development. Those learners in socioeconomically or technologically deprived areas are at most risk of disadvantage －although this disparity is decreasing as networked technologies become increasingly prevalent. The authors stress that teacher-learner interaction remains vital, however, emphasizing the value of a holistic approach that takes into consideration the needs of all stakeholders.

要旨：COVID-19 の最近の影響により、コンピューターの支援による言語学習（CALL）が増加し、常に進化している。そのため、今までの教育方法を見直す必要がある。教育学に影響を与える「構造」、「コミュニケーション」、「統合」の 3 つの段階がある。教育機関にとって、CALL は柔軟性、アクセシビリティ、リモート学習を含むいくつかの利点を提供するが、評価を困難にする。教師の役割も、テクノロジーへの彼らの興味とアクセス環境に応じて影響を受ける。彼らは適応するための戦略を必要とするであろう。テクノロジーを通じて、相互作用、リテラシー、認知能力の向上が図られるため、学習者は最も重要な考慮事項である。ただし、教師と学習者の相互作用は依然として重要である。

Key words : Computer-assisted Language Learning, Educational Technologies, SLA, FLA.

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Background

The scope of technology-enhanced learning (TEL) is both vast and inherently multidisciplinary, with its application in the reinforcement and expansion of knowledge, literacy, and interactivity taking many forms. Due to this increasing prevalence, there has emerged an expectation for practitioners to not only utilize digital tools to support learning (Fotos & Browne, 2004), but to observe the intersection of theory, practice, and reflection with regards to the practical application of educational technologies. This expression of this praxis-orientated approach is none more visible than within the sphere of applied linguistics, where digitally-mediated approaches have visibly impacted the domains of language processing, sociolinguistics, and second and foreign language acquisition (SLA & FLA, respectively) (Kumaresen et al., 2012). More specifically, there is a growing body of literature (e.g., Cutrim Schmid, 2006 ; Reinders & Hubbard, 2013) that reflects the broader social and pedagogical applications of computer-assisted language learning (CALL) due to the extensive dissemination of digital technologies and their emergence as a viable medium for inclusive, task-orientated education.

Put simply, CALL may be described as "the use of a computer in the teaching or learning of a second or foreign language" (Richards & Schmidt, 2010, p.110), with this definition commonly extended to incorporate the use of specialized educational tools, including corpora and concordancing software and an array of general pedagogical interventions, such as smartphone applications, virtual learning environments, and interactive whiteboards, within language learning settings. Traditionally an area of relevance only to those within specialist linguistic communities (Shaalan, 2005), contemporary research into CALL is connected not only to broader areas of study within applied linguistics (Beatty, 2010), but often general trends in education, including learner empowerment, interactivity, and multiculturalism. Despite this increasing prevalence, however, CALL remains a young and often reactionary branch of learning, frequently bound to continually evolving pedagogical context, dynamic social and technological innovation (Beatty, 2010), and divergences in the advancement of digital literacy between learners and educators (Prensky, 2001).

Given the recent and sudden attention paid to online delivery methods, it is appropriate that this inquiry focus entirely on the digital components of CALL－i.e., computer-based information and communication technologies (Selwyn, 2017). Be as that may, it is not the aim of this inquiry to provide a comprehensive analysis of TEL ; rather, this paper serves to present CALL as an exemplar of its broadening parent field and to establish its status as a powerful learning tool that retains the capacity to frame how learners absorb language and interact with the world. An awareness of the contextual factors surrounding the utilization of CALL is crucial in understanding the pedagogical implications associated with the approach. It is thus the purpose of this paper to first present a concise overview of CALL's historical and theoretical stages of development, and follow this with a critical examination of the benefits and apprehensions inherent to the approach that is appreciative of contemporary trends of CALL analysis. In doing so, this inquiry aims to explore the manner by which these factors impact upon the institution, educator, and learner during the conjunction of digital content and language acquisition, and to ultimately assess CALL's suitability as a vehicle for explorative language education.

The Historical Development of CALL

Technology-enhanced education has been utilized by language learning practitioners for over half a century, with the discipline commonly recognized (Warschauer & Healey, 1998 ; Yang, 2010) as being chronologically and structurally divided into three phases of development. It should be noted, however, that the realization of one stage does not *necessarily* result in the discontinuation of the methods and learning objectives that preceded it. Preferably, that which has been established may be incorporated into the latest advancement (Beatty, 2010 ; Warschauer, 1996), resulting in a holistic approach that is inclusive of multiple learning paradigms.

Phase 1 : Structural CALL (the 1950s-1970s)

Initial forays into CALL materialized during the 1950s and focused on the application of automated "computer-as-a-tutor" instructional paradigms in an effort to elicit linguistic habit formation (Warschauer & Healey, 1998). Early advancements in the field included the development of the University of Illinois' Programmed Logic/Learning for Automated Teaching Operations (PLATO) system, employed initially, if not exclusively, in the "explicit teaching of [Russian] grammar by utilizing linear and repetitive drill-and-practice techniques via the grammar-translation method" (Smith & Kim, 2017, p.324). CALL's early reliance on behaviorist interventions aligned with the theory's increased prominence during this period, guided primarily by B.F. Skinner's (1957) inquiries into operant conditioning. It should be noted, however, that the association between FLA and behaviorist methodologies holds historical precedence, with Richards & Rogers (2014) describing the behaviorist-affiliated grammar-translation approach as the dominant European model for language instruction in the century preceding the advent of CALL.

In accordance with Skinner (1957), initial CALL exercises were firmly linear, requiring learners to accurately complete a series of linguistic progressions that increased gradually in their complexity. Feedback was immediate, providing positive reinforcement "in the form of points and advancement for correct answers" (Beatty, 2010, p.19), with these activities a visible representation of the programmed instruction (Saettler, 1990) and audio-lingual methods. Nevertheless, while early CALL exercises were concurrent with the predominant psychological school of the period, they were fundamentally digital adaptations of textbook-based learning activities and thus failed to exploit the emerging pedagogical opportunities offered by TEL. This concern was abated somewhat by the development of more sophisticated computer simulations that allowed learners to explore the target language via branching choice selection. Subsequently, simulation-based exercises represent the genesis of a constructivist-aligned, explorative CALL that would see learners "bring what they understood about the world to the task(s)" (Beatty, 2010, p.19).

Consistent with broader educational movements, enthusiasm for structural CALL archetypes began to diminish throughout the 1960s, with Noam Chomsky's (1959) critique of the behaviorist school playing a pivotal role in the rise of what would come to be termed the *cognitive revolution* (Harnish, 2002). While this paradigm shift would ultimately lead to the widespread rejection of behaviorist approaches to language education on both the theoretical and pedagogical levels (Yang, 2010, p.909), structural CALL would persist throughout the decade. The approach does hold several pedagogical merits, however. Most notably, such activities are relatively simple to execute for large

groups in the presence of appropriate learning infrastructure. Further, the computer-as-a-tutor model allows language learners to engage content at an individual pace, with the mechanical nature of feedback providing an educational environment that is free from judgment (Warschauer & Healey, 1998, p.57), thereby acknowledging, if not explicitly, the affective considerations of the learner. Thus, while being overtly behaviorist, structural CALL exhibits connectivity with the humanistic instructional archetype that was to disseminate in the wake of the cognitive revolution.

Nonetheless, the disadvantages inherent in structural CALL and, indeed, all forms of behaviouristic education are well documented. Behaviourism is notably constrained by its inability to exploit high-order cognitive processes faithfully, potentially leaving learners unprepared for language acquisition tasks that utilize problem-solving or creative thinking. Indeed, behaviorist CALL is unable to account fully for linguistic proficiencies developed as a result of alternative instructional paradigms, most notably those which occur in the absence of positive or negative reinforcement. The one-dimensional nature of behaviorism thereby limits its capacity for understanding learner behaviors, including free will, feelings, and moods, or indeed "how learning takes place and how knowledge is constructed within the human mind" (Selwyn, 2017, p.77).

Phase 2 : Communicative CALL (the 1970s-1990s)

Following increased affordability and availability of microprocessors, the late 1970s witnessed a hitherto unprecedented circulation of low-cost personal computers. This technological revolution coincided with a linear transition in pedagogical context, supported by an expansion of cognitive-based theories of learning. Proponents of what would come to be termed *communicative CALL* contend that the practical use of linguistic forms should take precedence over the forms themselves, that grammar is best taught implicitly, and that learners should exploit existing linguistic schemata to generate original utterances, as opposed to manipulating predetermined phrases (Yang, 2010, p.909). Thus, while structural CALL had identified language as a passively-developed system, this emerging phase maintained that language acquisition is an actively-constructed, internal phenomenon, best achieved via a process of meaningful exploration and discovery (Warschauer & Healey, 1998).

Tasks associated with communicative language teaching (CLT) are "focused on all of the components of communicative competence and not restricted to grammatical or linguistic competence" (Brown, 1994, p.245). As a consequence, communicative CALL emphasizes comprehensive social interaction within the learning process to stimulate discussion, critical thinking, and the meaningful, non-predictive use of the target language. Activities that conform to the communicative approach make use of the intelligence of learners rather than computers, while simultaneously employing the latter as authentic providers of language. That is, rather than positioning computers as rule-bound knowledgeable informants ; devices provide consistent patterning of the target language for learners to explore and acquire collaboratively. In doing so, communicative CALL provides opportunities for the development of general cognitive abilities transferrable to other domains of study (Gilquin & Granger, 2010). For example, learners may undergo processes where, for inductive learning, they cooperatively observe content, make hypotheses and derive generalizations in and of the target language, or, during deductive learning, apply previously formed linguistic knowledge to confirm the validity of their progress via digital content. In this context, the CALL dynamic transitions from the *computer-as-a-tutor* model toward *computer-as-a-tool,* leading to an explicit "deviation in agency

towards the learner" (Smith & Kim, 2017, p.325).

Activities that foster learner autonomy include digital language learning portfolios, self-directed research tasks, or indeed any CALL enterprise that promotes learner reflection with regards to the realization of specific learning goals. Naturally, the autonomous regulation of language acquisition fosters learner empowerment, potentially increasing intrinsic motivation (Ballard & Butler, 2011). Nevertheless, while the synergy between communicative language acquisition and computer-mediated learning presents several advancements over its behaviorist-orientated predecessor (Warschauer, 1996), communicative CALL is not without its criticisms. Kenning & Kenning (1990), for example, call attention to the ad hoc and disconnected nature of its implementation throughout this period. While the introduction of personal computing allowed for enhanced incorporation of classroom technologies, CALL during this period was customarily segregated from *authentic* language learning environments in the form of specialized computer labs. The failure to integrate communicative CALL into broader curricula thereby resulted in content "making a greater contribution to marginal rather than to central elements" of the language acquisition process (Kenning & Kenning, 1990, p.90).

Phase 3 : Integrative CALL (the 1990s-present)

While the progression from behaviorist to communicative CALL represents an acute paradigm shift in terms of pedagogical and theoretical foci, the transference towards integrative CALL was decidedly less severe. Integrative CALL manifests per a socio-cognitive process of language acquisition, exhibiting a fluid evolution to the view that language is, predominantly, a cognitive mechanism. As noted by Warschauer & Healey (1998), integrative CALL attempts to improve upon its successor by integrating both TEL and the various features of communicative competence more extensively into the language acquisition process. This development was aided significantly by advancements in the provision of digital content and communication – namely, multimedia and the Internet. In this context, CALL provides a "greater emphasis on language use in authentic social contexts" (Warschauer & Healey, 1998, p.58), acting as a vehicle for dynamic socio-cultural learning by fostering communication and interactivity between local and global learners.

By identifying language acquisition in terms of its socio-cognitive demand, integrative CALL represents a Vygotskyan approach to language education (Fotos & Browne, 2004), in which emphasis is placed on authentic discourse within meaningful linguistic contexts. Thus, increased attention is paid to the provision of collaborative learning infrastructures (Coskun, 2011). Learners may, for example, utilize existing linguistic schemata to support and complement one another to realize those language acquisition goals that may have otherwise been too difficult to achieve autonomously (Smith & Kim, 2017, p.330) ; a separation which Vygotsky (1978) terms "the zone of proximal development" (p. 86). Given the presence of internet-driven computer-mediated communication (CMC), integrative CALL offers an enhanced foundation for observing the processes by which learners negotiate meaning during the formation and extension of linguistic competencies. Central to this approach is the mode of interaction between technology and the learner ; specifically, integrative CALL shifts its perspective from *learner-device* toward *learner-learner via the device,* providing a more authentic vehicle for interactivity. CMC applications appropriate to integrative language learning include e-mail, instant messaging services, and a host of cross-platform social media appli-

cations－with all mediums allowing learners to contribute to global real-time interaction. In doing so, integrative CALL exploits the learner's intrinsic motivation for communication to enhance cultural awareness, collaboration, and the authenticity of its language learning context.

Throughout the integrative process, the classroom serves as a space in which learners explore and creatively exploit the target language. As a consequence, the role of the educator is to facilitate proactive, autonomous, and reflective communication, and to enhance the learning environment via student-centered interactions. Moreover, their presence is critical in "giving students stimulating supporting materials, focusing on particular linguistic expressions, and generally knowing how to channel the students' reactions into constructive analytical patterns" (Blake, 2013, p.103). Feedback should be structured in such a manner that it provokes reflection concerning the appropriateness and effectiveness of language use and, following Bloom (1956), stimulates high-order cognitive processes, such as analysis, synthesis, and evaluation (Bax, 2003, p.21).

Finally, *integrative* is a term not only used to describe the enhanced synergy between cognitive-based instructional archetypes and CALL but the increased presence of digital infrastructures within formal and non-formal learning environments. As noted by Selwyn (2017), post-digital TEL characterizes itself by the emergence of "networking logic" (p. 15), in which Internet-capable devices, such as smartphones, tablets, and personal computers, synchronously and asynchronously connect learners to content and each other. Thus, the diffusion of technology has restructured CALL into a holistic language learning platform. Where once, a learner would relocate to an institution's dedicated CALL or IT laboratory, digital devices are now present in almost every room. Classrooms have become reconfigurable spaces with CALL's presence transcending the boundaries of traditional education, supporting mass socialization via interactivity irrespective of user location or demographic.

Contemporary Issues in CALL

As noted by Beatty (2010), CALL should not be interpreted as an exclusively positive agent of change ; as with any other learning instrument, it is also open to scrutiny and criticism. Indeed, given the impact of digital tools on a post-COVID-19 landscape, educational practitioners must maintain a firm understanding of both the advantages and limitations characteristic of the approach if they are to implement TEL within their specific contexts successfully. As a consequence, this section will present a critical analysis of digitally-mediated language education that is appreciative of broader trends in inquiry within both applied linguistics and non-specialized TEL.

The Status of the Learning Institution

As described previously, CALL, in its current manifestation, generates attention via the flexible provision of digitally-networked, socio-cognitive-based learning infrastructures. CALL's capacity for collaborative, asynchronous education, therefore, represents a potential disruption to fundamental conventions regarding the nature of formal language instruction. Kozma (as cited in Selwyn, 2017, pp.33-34) anticipates a digitally-driven reimagining of the educational institution, in which places of learning eschew functional isolationism in favor of integrating more fully within society. Jandric´ (2014) goes further, describing the potential for non-institutionalized, two-way TEL infrastructures to surpass traditional schooling. Nevertheless, while reports detailing the potential redundancy of

conventional educational institutions may appear, at this stage, premature ; social media and freely-accessible learning platforms, such as podcasts and massive open online courses (MOOCs), retain the capacity to shape personal learning environments, defined here as spaces in which "the user is connected with teachers, mentors, and other learners" (Friesen & Lowe, 2012, p.186).

With regard to CALL, the International Education Service's Massive Open Online English Course (MOOEC) facilitates a blended pedagogic model of English language instruction. Specifically, learners affiliate and participate in language education both online and at self-access centers both prior to and post-face-to-face enrollment at a traditional place of learning (MOOEC, 2017). This convergence of in-house and distributed methods of instruction provides users with several benefits. Most notably, multimodal instructional paradigms facilitate enhanced learner agency and autonomy regarding the "pace, place, and mode" (Gordon, 2014, p.4) of their language learning contexts. Moreover, the face-to-face component of the blend retains the capacity for the advanced pastoral and linguistic support potentially absent within strictly e-learning environments. These factors may be especially beneficial to non-traditional learners, such as mature students, professionals, and parents, who a) may have been removed from structured education for prolonged periods, and b) are required to accommodate learning around busy schedules. Nevertheless, one should note that "digital immigrant" (Prensky, 2001) language learners may, in some cases, lack the requisite technical skills to benefit initially from this approach. In this instance, it is imperative that local practitioners ensure that learners are acclimatized gradually to the digital systems in play, and not cognitively overloaded by their efforts to advance technological and linguistic proficiencies contemporaneously.

Virtual learning platforms in unison with complementary CMC accommodates the access, integration, and promotion of interest-driven personal learning ecosystems. Consequently, integrative CALL links itself to the concept of *connected learning,* in which the achievements, relationships, and personal interests of learners integrate holistically within a distinctly peer-supported, open-networked learning process. The interaction between online language learning and social media platforms links linguistic progress and "the support of friends, caring adults, and/or expert communities" (Kumpulainen & Sefton-Green, 2014, p.10). Subsequently, the interconnectedness of social media provides an outlet for dialogue and multi-sourced, collaborative linguistic production, while also disregarding the hierarchical structures typically associated with formal learning settings. Given that CALL permits continued access to learning materials, students may, by way of example, elect to share a language generation quandary amongst trusted peers or learning groups via social media or collaborative services, such as Zoom or Microsoft Teams, outside of formal schooling. Reinforcing or corrective feedback is thus received in a relaxed, humanistic space, thereby interlinking affective and cognitive benefits while concurrently enriching a linguistic community of practice.

Nonetheless, formal attempts to measure CALL-derived learning must take into account the disadvantages coupled to online pedagogies. Whilst peer-to-peer interaction is appropriate within the context of self-determined learning, the assessment of individual progress during cooperative practices can prove challenging. Specifically, concerns over plagiarism may occur when content is discussed online, where the division between collaboration and support may become distorted. However, as noted by Gordon (2014), "legislating and penalizing such behaviors ignores the trend towards shared knowledge and social media" (p.18). The practitioner must thereby provide effective

assessment measures that account for the effects of digitally-mediated cooperative learning infrastructures. Possible resolutions include a reduction in “traditional” testing models in favor of digital assessment methods, such as Wiki entries, online portfolios, video discussion chains, or blog activities, which permit specific review of individual contributions. Regardless of approach, however, one must ensure that flexible routes of assessment exhibit equivalency with established methods with regards to practicality and the degree of learner contribution.

Given the range of factors presented here, it is evident that any discussion regarding the application of CALL should abandon binary distinctions with regard to provision. The hybridization of TEL with more conventional forms of instruction offers institutions a flexible, interest-driven foundation for language acquisition that similarly recognizes the benefits of face-to-face interaction and its associated methodologies. Indeed, given the growing utilization of CMC as a collaborative space for learners to process and discuss content (Gordon, 2014), one could argue that formal learning is becoming increasingly blended, making either/or distinctions functionally redundant. CALL thereby affords institutions the opportunity to not only embrace emergent forms of pedagogy but a new and dynamic type of learner, also.

The Status of the Educational Practitioner

The emergence of CALL as a vehicle for learner-centered education has provoked a reassessment of the role of language teachers. Where once, the practitioner inhabited the part of a didactic transmitter of knowledge, cognitive-based paradigms in conjunction with the diffusion of information technologies have expedited a transition toward *facilitator of learning* archetypes. Given that such philosophies inherently promote learner autonomy and self-efficacy (Bandura, 1982), some commentators hold the belief that automated instruction may come to assume the majority of teaching functions (Beatty, 2010). Unsurprisingly, the analogy of the computer-as-a-teacher has drawn fierce criticism ; Williams (1998, pp.162-163), for instance, argues that such comparisons reinforce false conceptualizations apropos of what computers are, what they offer and, crucially, the processes by which educators and learners interact with one another.

In the case of integrative CALL, emphasis is placed on reciprocal dialogue between all participants. During this process, teachers act to not only stimulate communication, but provide comprehensible input, set content, address errors in language generation, monitor and review learning, provide reassurance and pastoral support, and guide learners toward their appropriate learning dynamics as they interact with CALL. These factors are particularly significant during preliminary learning when students are developing the requisite linguistic and technical scaffolds to navigate CALL content effectively. Thus, the elimination of teacher presence would remove a stimulant vital to initial and continued language learning processes. Moreover, while experiential approaches to TEL are distinguished by their interest-driven nature, a reduction in face-to-face contact with peers and formal educational practitioners may result in demotivation or a deviation from productive learning. This dynamic is especially pertinent when accounting for demographics of age, with younger learners, in particular, susceptible to distraction. The lack of immediacy may also impact upon error correction and contextual language usage, particularly with reference to spontaneous language production.

Accordingly, it should be noted that even highly-specialized linguistic programs frequently struggle to account for non-predictive language generation, such as idiomatic and colloquial phras-

ing. High-quality software packages that apply to the socio-cultural context of a specific language may be prohibitively expensive or difficult to source. That is not to say that CALL, whether facilitated via CMC, community-generated content, or AI is unable to account for the factors listed here. However, due to time zone or scheduling conflicts, synchronous CMC may be realistically unattainable ; user-generated content may be prepared by those inexperienced in pedagogical theory ; and AI, in its current manifestation, is unable to account sufficiently for the affective and cognitive considerations unique to individual language learners. The educator, if appropriately skilled, can consolidate the above with the additional benefits of immediacy and a physical, reassuring presence. Rather than displacing face-to-face instruction, CALL should be viewed as a complementary instrument that, if used both creatively and appropriately, will relieve educators of laborious functions, thereby enabling "students to receive individualized attention from both teachers and machines" (Ravichandran, 2000, p.87).

While reluctance to embrace digital pedagogies may stem from a lack of understanding over the status of technology, an increasingly digitalized society is calling for a reconciliation between the educator and TEL. Proficiency in the use of established techniques is no longer sufficient when accounting for the omnipresence of network technologies and sustained growth in "digital native" (Prensky, 2001) language learners. It is the contemporary practitioners' responsibility to not only facilitate digitally-mediated language acquisition but also to prepare learners for the application of networked technologies beyond the confines of the classroom (Hubbard, 2004). The advancement of learner digital literacy is undeniably a broad and holistic endeavor, yet deficiencies in the technical and theoretical knowledge of educators present a significant barrier to the practical application of CALL. As noted by Prensky (2001), divergences in teacher digital proficiency may stem from the generational gap between contemporary learners, who grew up surrounded by networked technologies, and those teachers who did not. For instance, given that pre-integrative CALL was typically excluded from language classrooms, it is perhaps understandable that "digital immigrant" language educators continue to place their trust in conventional instructional devices, such as textbooks. Nevertheless, the suspicion that "the use of computers threatens traditional literacy skills since such are heavily tied to books" (Patnaik & Venugopal, 2008, p.325) is not only fundamentally flawed, but damaging to the socio-contextual features of FLA, including cultural awareness, pragmatics and phonology, and thus, communicative competence as a whole.

Bax (2003) categorizes an alternative psychological distance, in which a combination of fear and awe, interspersed with exaggerated expectations with regards to applications of technology, inhibits educators from implementing CALL successfully. Specifically, the "sole agent fallacy" relies on the "assumption that the key or only factor in successful implementation of the technology is the technology itself" (Bax, 2003, p.25). Regardless of the educator's inclination to employ TEL, however, measures must be taken to enhance professional development and collaboration amongst language educators. Laurillard (2012), for instance, envisions teachers working alongside and indeed working as researchers to effect and disseminate reflective practice. While issues of workload and budgets present noticeable barriers to such an approach, more practical "design patterns" offer educators the opportunity to externalize solutions to recurrent pedagogical issues via the distribution of semi-structured methodologies. In essence, teachers and faculties distribute resources throughout the FLA community, contributing to the cooperative development of "resources and tools for supported

independent learning" (Laurillard & Kennedy, 2017, p.12). Given that teaching, whether at the micro or macro levels, is a constant collaborative process, design patterns should, in theory, represent an adaptation of pre-existing professional competency and thus be relatively simple to adopt.

The Status of the Learner

When evaluating the potential implications of CALL, the most significant considerations are undeniably those tied directly to the learner. For instance, given the inherent fluidity of the medium, CALL exhibits the potential to support independent learning via provision of individualized content that is adaptive to the specific preferences of the user. Notable in this approach is the opportunity for inhibited or underachieving students to enhance their levels of performance, communication, and participation via learner-centered language activities embedded within personally relevant or familiar contexts. Moreover, during such tasks, high-achieving students may realize their full language learning potential without impeding peers from processing content at their own pace. This dynamic may foster positive attitudinal changes amongst the majority of learners, with particular regard to learning motivation and self-efficacy. As a consequence, learners are "less dependent on a teacher and have more freedom to experiment on their own with natural language in natural or semi-natural settings" (Barani, 2013, p.512). CALL, therefore, offers a compelling medium for fostering both learner inclusivity and autonomy－with these factors enhanced further in the presence of socially interactive activities that facilitate communication, collaboration, and experimentation (Blake, 2013).

One significant outcome of integrative CALL is the shifting notion of the individual, specifically learner identity (Gordon, 2014). As established by White (2007), "identity is… constructed, negotiated, and maintained to a significant extent through language and discourse" (p. 101). Thus, if language learning is to be truly impactful, it requires an approach that accounts for the inherent complexity and distinctiveness of language learners, their respective social contexts, and the processes by which participants view themselves and others within the context of the target language and culture (Harklau, 2007). This heterogeneity of the self extends beyond "physical" and "digital" personas ; it encompasses divergences in consciousness with regards to the sociolinguistic context of each language. Indeed, language is a fundamental representation of culture ; each instance provides a unique lens by which to view the world or, as famously stated by Charlemagne, "to have another language is to possess a second soul." In this context, CALL ecologies that mediate social interaction and the exploration of target cultures not only accommodate but *nurture* the discursive, pluralistic nature of learner identity and self-growth.

Nonetheless, Laurillard & Kennedy (2017) note that the transnational nature of education has, more often than not, compelled international learners to adapt to the cultural and pedagogical contexts of their host institution. By contrast, ex-situ CALL content, such as MOOCs, exhibit the potential to situate the culture of the target language within the context of the learner, providing an educational setting more receptive to diverse socio-contextual paradigms (Laurillard & Kennedy, 2017), while contemporaneously enhancing *both* first and second language competencies. As a consequence, the potential for inclusive learning is, perhaps, the defining benefit of CALL. The approach offers a tangible medium with which to combat socio-educational inequality, including variances in provision with regards to gender, age, location, physical capability, socio-economic status, and a variety of additional factors. Access to digital language learning platforms enhances not only linguistic

but psychological variables, including self-efficacy and esteem, via the realization of linguistic goals that may, in turn, scaffold other domains of study.

The provision of CALL to disadvantaged groups presents an appreciable opportunity for self-betterment and the improvement of opportunity. Nevertheless, the digital divide remains an all-too-real social and economic inequity that impacts individuals, families, and geographical areas within developing and developed nations alike. The relative scarcity of high-speed internet infrastructures within economically disadvantaged settings, in conjunction with a lack of acceptance for TEL within specific cultures, present noticeable barriers to equitable CALL participation. Nevertheless, as digital technologies continue their dissemination, the divide is gradually narrowing. The Pew Research Center (2018), for instance, notes that American smartphone ownership has risen to 77%, a considerable increase on the 35% that was recorded by the same organization in a previous study (Zickuhr, 2011). Such devices promote further digital equity, acting as key drivers of inclusive education by granting access to target languages and cultures to traditionally disadvantaged populations – with Pew (2018) noting that the use of smartphones as a principal means of online access is "especially common among younger adults, non-whites and lower-income Americans."

Conclusion

The continued migration of language education to network-based solutions has provoked a reconfiguration of FLA environments into settings in which digital and linguistic competencies advance per collaborative, experiential processes. With this in mind, integrative CALL offers a compelling vision for FLA, and for observing how social, cognitive, and affective factors impact the flow of knowledge during the conjunction of digital content and linguistic acquisition. Most notably, CALL in its current manifestation holds the potential to make significant contributions to student-centeredness, learner interaction, achievement, motivation, self-efficacy, and global understanding ; and for fostering learning environments in which students can develop digital literacy via creative processes and, by association, multidisciplinary high-order cognitive mechanisms. Nevertheless, it should be noted that empirical evidence proving the potential of CALL remains relatively underdeveloped ; educators should be cautious to distinguish the functional veracity of the medium and to reject the assumption that the presence of CALL alone is sufficient to facilitate FLA. Integrative CALL, while versatile, does not provide a complete facsimile of learner-mentor interaction. Educators should thereby embed their pedagogical knowledge into digital activities that maintain and promote autonomously-driven learning, while also providing the opportunity for individual student contact.

To conclude, engaging in digitally-mediated language instruction is a persistent challenge that requires the constant reappraisal of one's pedagogical methods. However, as the population of "digital native" learners increases, so too does the requirement for – and, indeed, confidence in – technological learning interventions. This paper, in presenting the respective advantages and limitations of CALL, calls for language educators to embrace a flexible and adaptive approach to language acquisition that provides infrastructures for cooperative and explorative learning, while also exhibiting the potential to facilitate positive affectual and language acquisition changes in disadvantaged demographics. The continued and vertiginous rise of networked technologies is currently redefining the roles and identities of educators and learners alike ; it is thus consistent that language educators

adapt their technical and pedagogical competencies to meet local and global educational imperatives and, crucially, the diverse language learning modes of their students.

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